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EXAMINER
NGUYEN, SANG H

ART UNIT	PAPER NUMBER
2877	

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/660,540	SCHICK, ANTON	
	Examiner	**Art Unit**	
	sang nguyen	2877	

-- The MAILING DATE of this communication app ars on th cov r sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *12 September 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-36* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-36* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *12 September 2003* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *09/12/03*.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: _____.

DETAILED ACTION

Priority

Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Drawings

The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the "**an analysis unit**" in claims 1 and 36; the "**a plurality of point light sources**" in claims 5, 15, and 27; the **a plurality of point detectors**" in claims 5, 15, and 27; the "**grating system**" in claims 6-8, 10-12, 16-19, and 28-30; the "**microleneses**" in claims 8, 16, and 30 must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-3, 5, 13, and 35-36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kuhn et al (U.S. Patent No. 5,785,651 submitted by Applicant) in view of Strater et al (U.S. Patent No. 5,165,063).

Regarding claims 1 and 35-36; Kuhn et al discloses a sensor for measuring optical distance based on a confocal imaging principle, comprising:

- a light source (42 of figure 2) for emitting an illuminating light with different wavelengths so as a shorter wavelength and longer wavelength (col. 5 lines 30-35);
- an optical imaging system (figure 2), considered to be an input optics (44 of figure 2) and an objective lens (50 of figure 2), for directing the illuminating light focused onto a surface of the measurement object (70 of figure 2), wherein different wavelengths of the illuminating light (72, 74 of figure 2) are adapted to be focused at different distances (figures 1-3) from the optical imaging system (18 of figure 2) due to a chromatic aberration of the optical imaging system (col.2 line 66 to col.3 line 10 and lines 45-50);
- a beam splitter (46 of figure 2) for separating spatially from the beam path of the illuminating light (72, 74 of figure 2) to the surface object (70 of figure 2) and reflecting back at least partially illuminated light (72, 74 of figure 2) from the surface object (70 of figure 2);
- a light receiver considered to be a spectrometer or a detector (48 of figure 2) for the measuring light separated spatially from the beam path of illuminating light (72, 74 of figure 2) with spectral resolution; and
- an analysis unit considered to be a computer (col. 8 lines 30-59 and figures 6-7) for determining the distance between the sensor and the

surface from the intensities of the measuring light detected with different wavelengths (col.2 lines 36-45, col.3 line 30 to col.4 line 9). See figures 1-7.

Kuhn et al discloses all of features in claimed invention except for an illuminating light with different spectral components by a white light source. However, Strater et al teaches it is known in the art to provide device for measuring distances using optical element of large chromatic aberration having a white light source (1 of figure 5 and col.3 lines 19-20) for emitting at least two points onto a measured object (S of figure 5) with different spectral components are a blue spectral component at distance d(blue) and a red spectral component at distance d(red) are considered long and short wavelengths (col.28-40 and figure 2). See figures 1-10.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify a sensor for measuring optical distance based on a confocal imaging principle of Kuhn et al with an illuminating light with different spectral components by a white light source as taught by Strater et al for the purpose of measuring range or higher accuracy reflecting surface object with a function of different distances between each point of the surface to the principal plane (col.3 lines 30-33).

Regarding claim 2; Kuhn et al discloses the measuring light of illuminated light (72, 74 of figures 2a-2b) is fed through the optical imaging system (50 of figure 2a-2b).

Regarding claims 3 and 13; Kuhn et al discloses all of features in claimed invention except for the light source is a white light source. However, Strater et al teaches it is known in the art to provide the light source is a white light source (1 of

figure 5 and col.3 lines 19-20). it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify a sensor for measuring optical distance based on a confocal imaging principle of Kuhn et al with the light source is a white light source as taught by Strater et al for the purpose of measuring range or higher accuracy reflecting surface object.

Regarding claim 5; Kuhn et al discloses all of features in claimed invention except for the light source having a plurality of point light sources and the light receiver having a plurality of point detectors, wherein one point detector and one point source are associated together and are arranged in a confocal manner in relation to each other. However, Strater et al teaches that the light source (12 of figure 7) having a plurality of point light sources (a, b of figure 7) and the light receiver is CCD array camera (6 of figure 7) having a plurality of point detectors (a, b of figure 7) , wherein one point detector and one point source are associated together and are arranged in a confocal manner in relation to each other (col.3 lines 34-42 and col.4 lines 45-55 and col.5 lines 32-34). it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify a sensor for measuring optical distance based on a confocal imaging principle of Kuhn et al the light source having a plurality of point light sources and the light receiver having a plurality of point detectors, wherein one point detector and one point source are associated together and are arranged in a confocal manner in relation to each other as taught by Strater et al for the purpose of measuring different distances to the light points on the surface object and different sensitivity for each individual wavelength.

Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kuhn et al in view of Strater et al as applied to claim 1 above, and further in view of Schick et al (U.S. Patent No. 5,448,359).

Regarding claim 4; Kuhn et al and Strater et al discloses all of features in claimed invention except for the light receiver is a color camera. However, Schick et al teaches that the light receive is a color camera (col.2 lines 45-47). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify a sensor for measuring optical distance based on a confocal imaging principle of Kuhn et al with a color camera as taught by Schick et al for the purpose of detecting different colors of reflect lights.

Claims 6-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kuhn et al in view of Strater et al as applied to claims 1 and 5, above, and further in view of Doemens et al (U.S. Patent No. 5,991,040).

Regarding claims 6-7; Kuhn et al and Strater et al discloses all of features in claimed invention except for a grating system with a plurality of diffraction gratings is used to provide at least one of light point sources and the point detectors, wherein the grating system is one dimensional diffraction grating. However, Doemens teaches that it is known in the art to provide a grating system considered to be plurality of point light sources (1.1, 1.2, 1.3 of figure 1) and point photodetectors (4.1, 4.2, 4.3 of figure 1) with a plurality of diffraction gratings considered diaphragms (3 of figure 1) having a plurality of holes or apertures (figures 1) is used to provide at least one of light point sources and the point detectors (2 and 4 of figure 1), wherein the grating system is one dimensional

diffraction grating (3 of figure 1). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify a sensor for measuring optical distance based on a confocal imaging principle of Kuhn et al with a grating system with a plurality of diffraction gratings is used to provide at least one of light point sources and the point detectors, wherein the grating system is one dimensional diffraction grating as taught by Doemens et al for the purpose of generating the variation of the optical path length so that the light has different wavelengths and a confocal height measurement points arranged on a line more cost effective and faster.

Claims 8 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kuhn et al, Strater et al, and Doemens et al as applied to claims 1 and 5-7 above, and further in view of Watkins et al (U.S. Patent No. 6,731,383).

Regarding claims 8 and 16; Kuhn et al, Strater et al, and Doemens et al discloses all of features in claimed invention except for the grating system has an arrangement of microlenes. However, Watkins et al teaches that it is known in the art to provide a grating microlens area array (44 of figures 1-2). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify a sensor for measuring optical distance based on a confocal imaging principle of Kuhn et al with the grating system has an arrangement of microlenes as taught by Watkins et al for the purpose of narrow focal range for creating multiple parallel confocal optical paths along a line whereby the out of focus [defocus] light is eliminated.

Claim 9-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kuhn et al in view of Strater et al as applied to claim 1 above, and further in view of Dixon (U.S. Patent No. 5,737,121).

Regarding claims 9-11, Kuhn et al and Strater et al discloses all of features in claimed invention except for at least one further optical imaging system arranged in the beam path of illuminated light, and an intermediate image of the light source is between the further optical imaging system and the optical imaging system, wherein the intermediate image having a diffraction gratings of grating system and a rotating Nipkow disk. Dixon teaches that a further optical imaging system (128, 122 of figure) arranged in the beam path of illuminated light (figure 2) and an intermediate image (110 of figure 2) is between the further optical imaging system (128, 122 of figure 2) and the optical imaging system (200 of figure 2), wherein the intermediate image (110 of figure 2) having a diffraction gratings (111 of figure 2) of grating system and the intermediate image is a rotating Nipkow disk (110 of figure 2) by a motor (112 of figure 2). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify a sensor for measuring optical distance based on a confocal imaging principle of Kuhn et al with at least one further optical imaging system arranged in the beam path of illuminated light, and an intermediate image of the light source is between the further optical imaging system and the optical imaging system, wherein the intermediate image having a diffraction gratings of grating system and a rotating Nipkow disk as taught by Watkins et al for the purpose of focusing to points on the real image plane and very high resolution image of a small area of the sample.

Regarding claim 12; Kuhn et al and Strater et al discloses all of features in claimed invention except for the grating system having a stationary at least one of a one dimensional or two dimensional diffraction grating. However, Dixon teaches that the grating system having a stationary at least one of a one dimensional or two dimensional diffraction grating (11 of figure 2). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify a sensor for measuring optical distance based on a confocal imaging principle of Kuhn et al with the grating system having a stationary at least one of a one dimensional or two dimensional diffraction grating as taught by Watkins et al for the purpose of reducing noise generating illuminated light and reflected light.

Claims 14-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kuhn et al in view of Strater et al as applied to claims 1-2 and 13 above, and further in view of Schick et al (U.S. Patent No. 5,448,359).

Regarding claim 14; Kuhn et al and Strater et al discloses all of features in claimed invention except for the light receiver is a color camera. However, Schick et al teaches that the light receive is a color camera (col.2 lines 45-47). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify a sensor for measuring optical distance based on a confocal imaging principle of Kuhn et al with a color camera as taught by Schick et al for the purpose of detecting different colors of reflect lights.

Regarding claim 15; Kuhn et al discloses all of features in claimed invention except for the light source having a plurality of point light sources and the light receiver

having a plurality of point detectors, wherein one point detector and one point source are associated together and are arranged in a confocal manner in relation to each other. However, Strater et al teaches that the light source (12 of figure 7) having a plurality of point light sources (a, b of figure 7) and the light receiver is CCD array camera (6 of figure 7) having a plurality of point detectors (a, b of figure 7) , wherein one point detector and one point source are associated together and are arranged in a confocal manner in relation to each other (col.3 lines 34-42 and col.4 lines 45-55 and col.5 lines 32-34). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify a sensor for measuring optical distance based on a confocal imaging principle of Kuhn et al the light source having a plurality of point light sources and the light receiver having a plurality of point detectors, wherein one point detector and one point source are associated together and are arranged in a confocal manner in relation to each other as taught by Strater et al for the purpose of measuring different distances to the light points on the surface object and different sensitivity for each individual wavelength.

Claims 17-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kuhn et al in view of Strater et al, and further in view Schick et al as applied to claims 1-2 and 13-15, above, and further in view of Doemens et al (U.S. Patent No. 5,991,040).

Regarding claims 17-18; Kuhn et al, Strater et al, and further Schick et al discloses all of features in claimed invention except for a grating system with a plurality of diffraction gratings is used to provide at least one of light point sources and the point

detectors, wherein the grating system is one dimensional diffraction grating. However, Doemens teaches that it is known in the art to provide a grating system considered to be plurality of point light sources (1.1, 1.2, 1.3 of figure 1) and point photodetectors (4.1, 4.2, 4.3 of figure 1) with a plurality of diffraction gratings considered diaphragms (3 of figure 1) having a plurality of holes or apertures (figures 1) is used to provide at least one of light point sources and the point detectors (2 and 4 of figure 1), wherein the grating system is one dimensional diffraction grating (3 of figure 1). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify a sensor for measuring optical distance based on a confocal imaging principle of Kuhn et al with a grating system with a plurality of diffraction gratings is used to provide at least one of light point sources and the point detectors, wherein the grating system is one dimensional diffraction grating as taught by Doemens et al for the purpose of generating the variation of the optical path length so that the light has different wavelengths and a confocal height measurement points arranged on a line more cost effective and faster.

Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kuhn et al, Strater et al, Schick et al and Doemens et al as applied to claims 1-2 and 13-18 above, and further in view of Watkins et al (U.S. Patent No. 6,731,383).

Regarding claim 19; Kuhn et al, Strater et al, Schick et al, and Doemens et al discloses all of features in claimed invention except for the grating system has an arrangement of microlenes. However, Watkins et al teaches that it is known in the art to provide a grating microlens area array (44 of figures 1-2). It would have been obvious to

one having ordinary skill in the art at the time the invention was made to modify a sensor for measuring optical distance based on a confocal imaging principle of Kuhn et al with the grating system has an arrangement of microlenes as taught by Watkins et al for the purpose of narrow focal range for creating multiple parallel confocal optical paths along a line whereby the out of focus [defocus] light is eliminated.

Claim 20-24 and 26-27are rejected under 35 U.S.C. 103(a) as being unpatentable over Kuhn et al (U.S. Patent No. 5,785,651 submitted by Applicant) in view of Strater et al (U.S. Patent No. 5,165,063).

Regarding claim 20; Kuhn et al discloses a sensor for measuring optical distance based on a confocal imaging principle, comprising:

- an optical imaging system (figure 2) means for, considered to be an input optics (44 of figure 2) and an objective lens (50 of figure 2), directing the illuminating light focused onto a surface of the measurement object (70 of figure 2), wherein different wavelengths of the illuminating light (72, 74 of figure 2) are adapted to be focused at different distances (figures 1-3) from the optical imaging system (18 of figure 2) due to a chromatic aberration of the optical imaging system (col.2 line 66 to col.3 line 10 and lines 45-50);
- a beam splitter means (46 of figure 2) for separating spatially from the beam path of the illuminating light (72, 74 of figure 2) to the surface object (70 of figure 2) and reflecting back at least partially illuminated light (72, 74 of figure 2) from the surface object (70 of figure 2); and
- an analysis unit means for considered to be a computer (col. 8 lines 30-59

and figures 6-7) to determine the distance between the sensor and the surface from the intensities of the measuring light detected with different wavelengths (col.2 lines 36-45, col.3 line 30 to col.4 line 9). See figures 1-7.

Kuhn et al discloses all of features in claimed invention except for an illuminating light with different spectral components by a white light source. However, Strater et al teaches it is known in the art to provide device for measuring distances using optical element of large chromatic aberration having a white light source (1 of figure 5 and col.3 lines 19-20) for emitting at least two points onto a measured object (S of figure 5) with different spectral components are a blue spectral component at distance d(blue) and a red spectral component at distance d(red) are considered long and short wavelengths (col.28-40 and figure 2). See figures 1-10.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify a sensor for measuring optical distance based on a confocal imaging principle of Kuhn et al with an illuminating light with different spectral components by a white light source as taught by Strater et al for the purpose of measuring range or higher accuracy reflecting surface object with a function of different distances between each point of the surface to the principal plane (col.3 lines 30-33).

Regarding claim 21; Kuhn et al discloses the measuring light of illuminated light (72, 74 of figures 2a-2b) is fed through the optical imaging system (50 of figure 2a-2b).

Regarding claims 22-23; Kuhn et al discloses all of features in claimed invention except for a means for generating the illuminated light is a white light source. However,

Strater et al teaches it is known in the art to provide the a light source means for is a white light source (1 of figure 5 and col.3 lines 19-20). it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify a sensor for measuring optical distance based on a confocal imaging principle of Kuhn et al with the light source is a white light source as taught by Strater et al for the purpose of measuring range or higher accuracy reflecting surface object.

Regarding claims 24 and 26; a light receiver considered to be a spectrometer or a detector (48 of figure 2) for the measuring light separated spatially from the beam path of illuminating light (72, 74 of figure 2) with the measuring light detected with different wavelengths (col.2 lines 36-45, col.3 line 30 to col.4 line 9).

Regarding claim 27; Kuhn et al discloses all of features in claimed invention except for the light source having a plurality of point light sources and the light receiver having a plurality of point detectors, wherein one point detector and one point source are associated together and are arranged in a confocal manner in relation to each other. However, Strater et al teaches that the light source (12 of figure 7) having a plurality of point light sources (a, b of figure 7) and the light receiver is CCD array camera (6 of figure 7) having a plurality of point detectors (a, b of figure 7) , wherein one point detector and one point source are associated together and are arranged in a confocal manner in relation to each other (col.3 lines 34-42 and col.4 lines 45-55 and col.5 lines 32-34). it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify a sensor for measuring optical distance based on a confocal imaging principle of Kuhn et al the light source having a plurality of point light

sources and the light receiver having a plurality of point detectors, wherein one point detector and one point source are associated together and are arranged in a confocal manner in relation to each other as taught by Strater et al for the purpose of measuring different distances to the light points on the surface object and different sensitivity for each individual wavelength.

Claim 25 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kuhn et al in view of Strater et al as applied to claim 20 and 24 above, and further in view of Schick et al (U.S. Patent No. 5,448,359).

Regarding claim 25; Kuhn et al and Strater et al discloses all of features in claimed invention except for the light receiver is a color camera. However, Schick et al teaches that the light receive is a color camera (col.2 lines 45-47). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify a sensor for measuring optical distance based on a confocal imaging principle of Kuhn et al with a color camera as taught by Schick et al for the purpose of detecting different colors of reflect lights.

Claims 28-29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kuhn et al in view of Strater et al as applied to claims 20, 22, and 26-27 above, and further in view of Doemens et al (U.S. Patent No. 5,991,040).

Regarding claims 28-29; Kuhn et al, Strater et al discloses all of features in claimed invention except for a grating system with a plurality of diffraction gratings is used to provide at least one of light point sources and the point detectors, wherein the grating system is one dimensional diffraction grating. However, Doemens teaches that it

is known in the art to provide a grating system considered to be plurality of point light sources (1.1, 1.2, 1.3 of figure 1) and point photodetectors (4.1, 4.2, 4.3 of figure 1) with a plurality of diffraction gratings considered diaphragms (3 of figure 1) having a plurality of holes or apertures (figures 1) is used to provide at least one of light point sources and the point detectors (2 and 4 of figure 1), wherein the grating system is one dimensional diffraction grating (3 of figure 1). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify a sensor for measuring optical distance based on a confocal imaging principle of Kuhn et al with a grating system with a plurality of diffraction gratings is used to provide at least one of light point sources and the point detectors, wherein the grating system is one dimensional diffraction grating as taught by Doemens et al for the purpose of generating the variation of the optical path length so that the light has different wavelengths and a confocal height measurement points arranged on a line more cost

Claim 30 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kuhn et al, Strater et al and Doemens et al as applied to claims 20, 22, and 26-28 above, and further in view of Watkins et al (U.S. Patent No. 6,731,383).

Regarding claim 30; Kuhn et al, Strater et al, and Doemens et al discloses all of features in claimed invention except for the grating system has an arrangement of microlenes. However, Watkins et al teaches that it is known in the art to provide a grating microlens area array (44 of figures 1-2). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify a sensor for measuring optical distance based on a confocal imaging principle of Kuhn et al with the

grating system has an arrangement of microlenes as taught by Watkins et al for the purpose of narrow focal range for creating multiple parallel confocal optical paths along a line whereby the out of focus [defocus] light is eliminated.

Claim 31-34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kuhn et al in view of Strater et al as applied to claim 20 above, and further in view of Dixon (U.S. Patent No. 5,737,121).

Regarding claims 31-33, Kuhn et al and Strater et al discloses all of features in claimed invention except for at least one further optical imaging system arranged in the beam path of illuminated light, and an intermediate image of the light source is between the further optical imaging system and the optical imaging system, wherein the intermediate image having a diffraction gratings of grating system and a rotating Nipkow disk. Dixon teaches that a further optical imaging system (128, 122 of figure) arranged in the beam path of illuminated light (figure 2) and an intermediate image (110 of figure 2) is between the further optical imaging system (128, 122 of figure 2) and the optical imaging system (200 of figure 2), wherein the intermediate image (110 of figure 2) having a diffraction gratings (111 of figure 2) of grating system and the intermediate image is a rotating Nipkow disk (110 of figure 2) by a motor (112 of figure 2). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify a sensor for measuring optical distance based on a confocal imaging principle of Kuhn et al with at least one further optical imaging system arranged in the beam path of illuminated light, and an intermediate image of the light source is between the further optical imaging system and the optical imaging system, wherein the

intermediate image having a diffraction gratings of grating system and a rotating Nipkow disk as taught by Watkins et al for the purpose of focusing to points on the real image plane and very high resolution image of a small area of the sample.

Regarding claim 34; Kuhn et al and Strater et al discloses all of features in claimed invention except for the grating system having a stationary at least one of a one dimensional or two dimensional diffraction grating. However, Dixon teaches that the grating system having a stationary at least one of a one dimensional or two dimensional diffraction grating (11 of figure 2). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify a sensor for measuring optical distance based on a confocal imaging principle of Kuhn et al with the grating system having a stationary at least one of a one dimensional or two dimensional diffraction grating as taught by Watkins et al for the purpose of reducing noise generating illuminated light and reflected light.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Oren et al (6353216) discloses confocal measurement and system; Nishida (6157484) discloses confocal microscope and relay optical system for use in confocal microscope; Hasman et al (5880546) discloses method and apparatus for color code optical pofilometer; Goodman (5306902) discloses confocal method and apparatus for focusing in projection lithography; Derndinger et al (5239178) discloses optical device within an illumination grip and detector grip arranged confocally to an

object; Picard (4965441) discloses method and devices for scanning confocal light optical microscopic; Burke (4798469) discloses noncontact gage system; Gross et al (4585349) discloses method and apparatus for determining the position of a device; or Zanoni (3847485(discloses optical noncontacting surface sensor for measuring distance.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Sang Nguyen whose telephone number (571)-272-2425. The Examiner can normally be reached on Monday through Friday From 9:30 AM to 6:30 PM.

If attempts to reach the Examiner by telephone are unsuccessful, the Examiner's Supervisor, Mr. Frank Font, can be reached on (571) 272-2415. The fax number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

Nguyen/sn

May 5, 2004

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